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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/870,793	06/01/2001	Yuji Kubo	50212-246	8377

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MCDERMOTT WILL & EMERY LLP
600 13TH STREET, N.W.
WASHINGTON, DC 20005-3096

EXAMINER	
CURS, NATHAN M	
ART UNIT	**PAPER NUMBER**
2633	

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/870,793	Applicant(s) KUBO ET AL.	
	Examiner Nathan Curs	Art Unit 2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 February 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 June 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishakawa et al. (US Patent No. 5909297) in view of Ngo et al. ("Optical dispersion eigencompensators for high-speed long-haul IM/DD lightwave systems: computer simulation"; Ngo et al.; Lightwave Technology, Journal of, Vol: 14, Issue 10, Oct 1996; Pages 2097-2107).

Regarding claim 1, Ishakawa et al. disclose an optical transmission system comprising: an optical fiber transmission line disposed between a transmitter for transmitting a signal of a predetermined wavelength and a receiver for receiving the signal, through which the signal propagates from the transmitter toward the receiver (fig. 29-35 and col. 20, lines 34-63); a dispersion compensating system for compensating for both of chromatic dispersion and dispersion slope in said optical fiber transmission line (fig. 35 and col. 20, lines 61-63), where chromatic dispersion is the amount of dispersion at a wavelength as defined by the inherent dispersion slope of an optical fiber transmission line; a measuring system for monitoring variation in temperature of said optical fiber transmission line or variation of chromatic dispersion in said optical fiber transmission line (col. 20, lines 1-33); and a control system for controlling a dispersion compensation amount of said dispersion compensator, based on the result of measurement by said measuring system (col. 20, lines 44-63). Ishakawa et al. disclose that the dispersion compensator as a mach zehnder PLC dispersion compensator (col. 16, lines

1-12), but do not disclose that the fiber transmission line is comprised of a single-mode optical fiber or a non-zero dispersion-shifted optical fiber. Ngo et al. disclose a tunable mach-zehnder-based PLC dispersion compensator for use over SMF fiber (fig. 3 and page 2101, section III, col. 1, line 1 to col. 2, line 2). It would have been obvious to one of ordinary skill in the art at the time of the invention that SMF fiber could be used in the system of Ishakawa et al., since the dispersion compensation means suggested by Ishakawa et al. can be used for SMF fiber, as taught by Ngo et al. Further, it is well known in the art that SMF fiber allows transmission of high bit rate signals over long distances, and that SMF is already extensively installed in North America.

Regarding claim 2, Ishakawa et al. disclose an optical transmission system according to claim 1, wherein said measuring system includes a temperature sensor for detecting the temperature of said optical fiber transmission line (col. 20, lines 11-26).

Regarding claim 3, Ishakawa et al. disclose an optical transmission system according to claim 1, wherein said measuring system includes a dummy fiber transmission line disposed along said optical fiber transmission line, a light source for emitting monitor light of a predetermined wavelength into the dummy fiber transmission line, and a photodetector for receiving the monitor light having propagated through the dummy fiber transmission line (col. 20, lines 11-26), and wherein said control system calculates a variation amount of chromatic dispersion in said optical fiber transmission line, based on the result of detection of light quantity by the photodetector (col. 20, lines 27-33).

Regarding claim 4, Ishakawa et al. disclose an optical transmission system according to claim 2, wherein said temperature sensor includes an optical fiber temperature sensor disposed along said optical fiber transmission line (col. 20, lines 11-26).

Regarding claim 5, Ishakawa et al. disclose an optical transmission system according to claim 1, wherein said dispersion compensating system shifts the wavelength of the signal from said transmitter to the longer wavelength side or to the shorter wavelength side, thereby compensating for the variation of chromatic dispersion due to variation in temperature of said optical fiber transmission line (col. 17, line 10-62 and col. 20, lines 11-30).

Regarding claim 6, Ishakawa et al. disclose an optical transmission system according to claim 1, wherein said dispersion compensating system includes a dispersion compensator disposed on a signal light path from said transmitter to said receiver (col. 20, lines 44-63), and wherein said control system controls the dispersion compensation amount of said dispersion compensator according to a variation amount of chromatic dispersion in said optical fiber transmission line (col. 20, lines 27-33).

3. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishakawa et al. (US Patent No. 5909297) in view of Ngo et al. ("Optical dispersion eigencompensators for high-speed long-haul IM/DD lightwave systems: computer simulation"; Ngo et al.; Lightwave Technology, Journal of, Vol: 14, Issue 10, Oct 1996; Pages 2097-2107) as applied to claims 1-6 above, and further in view of Danziger et al. (US Patent Application Publication No. 2002/0006257).

Regarding claim 7, Ishakawa et al. disclose an optical transmission system according to claim 6, but do not disclose that said dispersion compensator includes a dispersion compensating optical fiber. Danziger et al. disclose a controllable dispersion compensator including dispersion compensating optical fiber (abstract and paragraphs 0010-0015). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the DCF-

based variable dispersion compensator of Danziger et al., in the system of Ishakawa et al., in order to control the amount of dispersion compensation in the system.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishakawa et al. (US Patent No. 5909297) in view of Ngo et al. ("Optical dispersion eigencompensators for high-speed long-haul IM/DD lightwave systems: computer simulation"; Ngo et al.; Lightwave Technology, Journal of, Vol: 14, Issue 10, Oct 1996; Pages 2097-2107) as applied to claims 1-6 above, and further in view of Eggleton et al. "Electrically tunable power efficient dispersion compensating fiber Bragg grating"; Eggleton et al., Photonics Technology Letters, IEEE, Vol: 11, Issue: 7, July 1999, Pages: 854-856).

Regarding claim 8, Ishakawa et al. disclose an optical transmission system according to claim 6, but do not disclose that said dispersion compensator includes an optical fiber grating. Eggleton et al. disclose a tunable dispersion compensator including an optical fiber grating (abstract, and page 856, Conclusion paragraph). It would have been obvious to one of ordinary skill in the art at the time of the invention to control the amount of dispersion compensation in the system of Ishakawa et al., using the grating-based tunable dispersion compensator because of it's power efficiency and small size, as taught by Eggleton et al.

Response to Arguments

5. Applicant's arguments filed 4 February 2005 have been fully considered but they are not persuasive.

The applicant again argues that Ishikawa et al. do not disclose or suggest the concept of forming an optical transmission system comprising a dispersion compensation system which compensates for both of chromatic dispersion and dispersion slope. The applicant further

argues that the notion of providing a dispersion compensating system for compensating dispersion slope is alien to Ishikawa et al! However, the Examiner responds again that the inherent dispersion slope of an optical fiber transmission line defines the value of chromatic dispersion at any given wavelength. The definition of "chromatic dispersion slope" provided by the applicant affirms this, defining chromatic dispersion slope as the derivative of chromatic dispersion as a function of wavelength. Chromatic dispersion slope is an inseparable mathematical relation to chromatic dispersion as a function of wavelength. Further, the applicant's specification discloses that it is common practice to use a dispersion compensator (e.g. dispersion compensating fiber) to compensate for dispersion and thus also dispersion slope (specification page 2, lines 16-25 and page 13, line 22 to page 14, line 10), and the inherent relationship between chromatic dispersion and chromatic dispersion slope is further seen in applicant's figure 3, as previously cited by the Examiner. Further, Ishikawa et al. discloses the same fundamental teaching, that chromatic dispersion is the amount of dispersion at a wavelength as defined by the inherent dispersion slope of an optical fiber transmission line (col. 20, lines 5-10, where the term "zero dispersion wavelength" means the wavelength at which chromatic dispersion is zero, thus revealing chromatic dispersion as a function of wavelength. This derivative of this dispersion function of wavelength is the dispersion slope).

Regarding the applicant's argument that Ishikawa et al. col. 20, lines 61-63 does not disclose a dispersion compensating system for compensating both chromatic dispersion and dispersion slope, the Examiner first asserts that the accurate representation of the Examiner's citation is "fig. 35 and col. 20, lines 61-63". Fig. 35 shows dispersion compensators, elements 101. These elements 101 are initially defined in Ishikawa et al. col. 15, line 56 to col. 16, line 12; however as instructed for the figures by Ishikawa et al., same numerals indicate same constituent parts. Therefore the elements 101 of fig. 35 and referred to in col. 20, lines 61-62,

are the same elements 101 as defined in col. 15, line 56 to col. 16, line 12, where Ishikawa et al. teach that element 101 is variable dispersion compensator capable of varying the amount of dispersion of a transmission line. The dispersion of a transmission line taught by Ishikawa et al. is chromatic dispersion as function of wavelength, where the derivative of chromatic dispersion as a function of wavelength is dispersion slope. Therefore, elements 101 applicable in fig. 35 compensate for the chromatic dispersion and dispersion slope of the transmission line.

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

6. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the

organization where this application or proceeding is assigned is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.

JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600